



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/691,746

10/22/2003

Dimitry Shur

8640

1979

7590 04/15/2008
PATENT COUNSEL
APPLIED MATERIALS, INC.
Legal Affairs Department
P.O. BOX 450A
Santa Clara, CA 95052

EXAMINER

JOHNSTON, PHILLIP A

ART UNIT

PAPER NUMBER

2881

MAIL DATE

DELIVERY MODE

04/15/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/691,746	Applicant(s) SHUR ET AL.	
	Examiner PHILLIP A. JOHNSTON	Art Unit 2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 January 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Detailed Action

1. This Office Action is submitted in response to the RCE filed 1-14-2008, wherein claims 1-4, 6, 9, 11, 12, 14-16, and 18 have been amended. Claims 1-18 are pending.

Claims Rejection – 35 U.S.C. 103

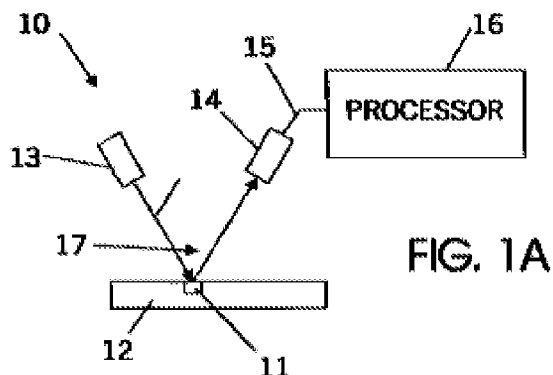
2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

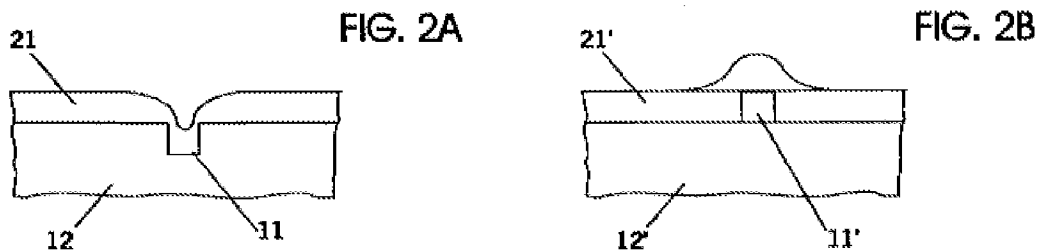
3. Claims 1, 3, 4, 6, 8, 9, 15, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 6,064,486 to Chen, in view of Bowes, USPN 6,778,275.

4. Regarding claim 15, 17, and 18, Chen discloses at Col. 5, line 3-10; an apparatus for measuring overlay error that includes the following;

(a) primary electron beam (13) shown in Figure 1A below, directed to an object 12, a scattered electron detector 14, and processor 16.



(b) an alignment mark having first (21) and second layers (12), where the second layer includes a second feature (11 or 11') buried under the first layer 21 or 21', where the second feature effects the shape of an area in the first layer as shown in Figures 2A and 2B below; and Col. 5, line 46-64.



Chen fails to teach an inspected object having a first feature formed on a first layer and a second feature formed on second layer, where the first and second features are not overlapping.

Bowes discloses an overlay measurement mark having a first layer 640 with feature 410 and second layer 630 with plural features, some of which are not overlapping (430, 450 etc.), as shown in Figure 6 below; Col. 11, line 62-67; and Col. 12, line 1-13.

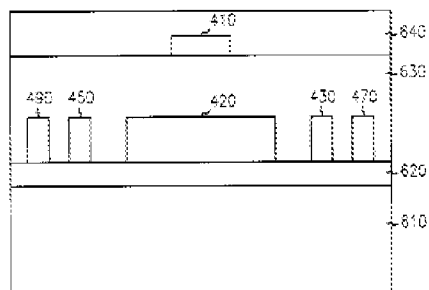


FIG. 6

Bowes modifies Chen to provide a multilayered alignment mark having patterns of different pitch located on different layers surrounding the box-in-box structure.

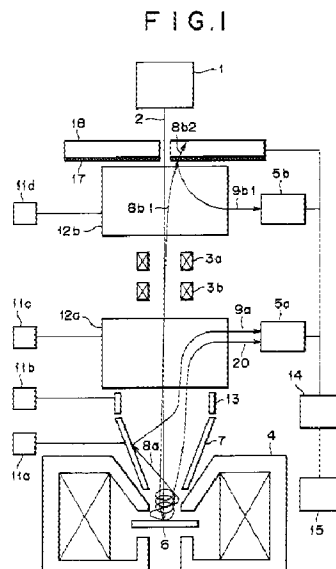
Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made that, Chen can be modified to use the layered mark of Bowes, to provide an estimate of overlay error with an electron beam device.

5. Regarding claims 1, 3, 4, 6, 8, and 9, the combination of Chen and Bowes discloses the apparatus used in these method claims, as describe above regarding claims 15, 17, and 18.

6. Claims 2,7,11-14, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 6,064,486 to Chen, in view of Bowes USPN 6,778,275, and in further view of Sawahata, U.S. Patent No. 6,501,077.

7. Regarding claims 2, 7, 11-14, and 16, the combination of Chen and Bowes fails to teach the detection of electrons reflected or scattered at small angles.

8. Sawahata discloses detecting reflected electron 8a generated at a low angle from the sample, using detector 5a. See Column 4, line 33-47; and Figure 1 below.



Therefore it would have been obvious to one of ordinary skill in the art that the overlay error detection apparatus and method of Chen and Bowes can be modified to use the detection of low angle reflected electrons in accordance with Sawahata to provide a scanning electron microscope where reflective electrons generated from a sample at a low angle can be detected efficiently.

9. Claims 5 and 10 are rejected under 103(a) as being unpatentable over USPN 6,064,486 to Chen, in view of Bowes USPN 6,778,275, and in further view of Hiroi, USPN 6,172,365.

10. Regarding claims 5 and 10 the combination of Chen and Bowes fails to teach the use of preliminary charging the second feature. However, Hiroi discloses pre-charging the sample surface to improve image resolution in an electron beam inspection apparatus. See Column 13, line 26-56.

Therefore it would have been obvious to one of ordinary skill in the art that the overlay error detection apparatus and method of Chen (486) can be modified to use the pre-charge method of Hiroi (365), to provide an electron beam inspection method, and apparatus, for reducing the charge-up phenomenon and obtaining a high-contrast signal representing a physical property by using secondary electrons or back-scattered electrons obtained from the object.

Conclusion

11. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (571) 272-2475. The examiner

can normally be reached on Monday-Friday from 7:30 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor Robert Kim can be reached at (571) 272-2293. The fax phone number for the organization where the application or proceeding is assigned is 571 273 8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PJ

March 31, 2008

/ROBERT KIM/

Supervisory Patent Examiner, Art Unit 2881

Application/Control Number: 10/691,746
Art Unit: 2881

Page 7